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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,822	08/25/2003	Hiroshi Okazaki	241806US3X	1809
22850	7590	05/18/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ECHELMeyer, ALIX ELIZABETH	
			ART UNIT	PAPER NUMBER

1745

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/646,822	Applicant(s) OKAZAKI ET AL.	
	Examiner Alix Elizabeth Echelmeyer	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10-17-03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgement of Applicant's claim to priority is made.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimanuki et al. (US Patent Number 6,713,204) in view of Dickman et al. (US Patent Number 6,465,118) in further view of Wattlelet et al. (US Patent Number 6,824,906).

Shimanuki et al. teach a fuel cell system including humidifiers for the oxidant and fuel gases and dehumidifiers for the off-gases. Although the fuel cell of this system requires that the inlet gases be humidified, a different fuel cell might require that they be dehumidified, depending on the type of membrane used in the fuel cell (2:64-67; 3:1-67; 4:1-6).

Shimanuki et al. fail to teach a hot water storage unit for the water used within the fuel cell cooling system.

Dickman et al. teach a thermal energy recovery system for use in the heat exchange system. The heat exchange fluid undergoes several passes through different

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heat exchangers. Dickman et al. teach the use of water as the heat exchange fluid if there is a concern that metal ions would be introduced to the stack and storage of the water in a tank within the heat exchange reservoir (4:27-67; 5:1-33, 43-63).

It would be desirable to combine the water heat exchange system of Dickman et al. with the fuel cell system of Shimanuki et al. if there is a concern that metal ions would be introduced to the stack.

Therefore, it would have been obvious to combine the heat exchange system of Dickman et al. with the fuel cell system of Shimanuki et al. in order to prevent metal ions from being introduced to the stack.

Shimanuki et al. in view of Dickman et al. fail to teach a laminated heat exchanger to house at least three heat exchangers, each to dehumidify inlet or outlet gases of the fuel cell.

Wattelet et al. teach a heat exchanger that includes a cathode exhaust condenser and a fuel cell stack cooler in side-by-side arrangement cooled by a common airstream (1:44-65). Wattelet et al. further teach that this system provides increased compactness, reduction in cost because fewer parts are required, and simplified mounting. Also, the common coolant stream increases efficiency and minimizes space required (5:49-67).

It would be desirable to combine the fuel cell and heat exchange system of Shimanuki et al. in view of Dickman et al. with the heat exchanger of Wattelet et al. by integrating all of the separated heat exchange systems, for example those of the

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dehumidification of the various gases required for running the fuel cell in order to increase compactness, reduce cost, and simplify mounting.

Therefore, it would have been obvious to one having ordinary skill in the art to combine the heat exchange system of Wattelet et al. with the system of Shimanuki et al. in view of Dickman et al. in order to increase compactness reduce cost, and simplify mounting.

As for claims 2-4, 6, 8-12, and 14, the combination above teaches the heat exchange system but fail to teach the exact arrangement claimed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the various heat exchangers to match the claimed arrangement, since it has been held that rearranging parts of an invention involves only routine skill in the art. MPEP 2144 (VI).

Regarding claim 5, Wattelet et al. teaches a reformer as part of the fuel cell system (3:14-37). Further, the combustion exhaust gas heat exchanger is also taught by Wattelet et al. (see above).

Regarding claim 7, Shimanuki et al. teach the use of a radiator within the heat exchanger when there is no secondary cooling line (5:44-52).

With regard to claim 13, Dickman et al. further teach the use of plate-type heat exchangers using water that can be recycled (3:33-38).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee


PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER